

CLAIMS

1. A liquid crystal display device comprising:
 - a liquid crystal cell comprising a pair of substrates and a liquid crystal layer arranged between the pair of substrates;
 - first and second polarizers arranged on either side of the liquid crystal cell;
 - a first retardation plate arranged between the liquid crystal cell and the first polarizer;
 - 10 a second retardation plate arranged between the liquid crystal cell and the second polarizer;
 - each of the first and second retardation plates having an optical axis in a plane parallel to the surfaces of the substrates and a retardation of substantially $\lambda/4$, the optical axis of the first retardation plate being perpendicular to the optical axis of the second retardation plate;
 - 15 the first and second polarizers having polarizing axes arranged at an angle of 45° with respect to the optical axes of the first and second retardation plates; and
 - the liquid crystal cell being arranged such that a state of alignment of the liquid crystal molecules changes, accompanying change in a polar angle and/or change in an azimuth upon application of voltage.
2. A liquid crystal display device comprising:
 - a liquid crystal cell comprising a pair of substrates and a liquid crystal layer arranged between the pair of substrates;
 - 30 first and second polarizers arranged on either side of the liquid crystal cell;
 - a first retardation plate arranged between the liquid crystal cell and the first polarizer;
 - a second retardation plate arranged
 - 35 between the liquid crystal cell and the second polarizer;
 - each of the first and second retardation plates having an optical axis in a plane parallel to the

surfaces of the substrates and a retardation of substantially $\lambda/4$, the optical axis of the first retardation plate being perpendicular to the optical axis of the second retardation plate;

5 the first and second polarizers having polarizing axes arranged at an angle of 45° with respect to the optical axes of the first and second retardation plates; and

10 the liquid crystal cell being arranged such that an azimuth distribution exists in a state of alignment of the liquid crystal molecules when the liquid crystal molecules are aligned horizontally or obliquely with respect to the surfaces of the substrates.

15 3. A liquid crystal display device according to claim 1 or 2, wherein at least a portion of the liquid crystal molecules are aligned in the azimuth except for 45° from the polarizing axes of the polarizers.

20 4. A liquid crystal display device according to claim 1 or 2, wherein the liquid crystal of the liquid crystal cell is of a vertical alignment type, the liquid crystal cell includes a structure or a slit arranged on the electrode of at least one of the substrates, and a state of alignment of the liquid crystal molecules located on one side of the structure or the slit is different from a state of alignment of the liquid crystal molecules located on the other side of the structure or slit.

25 5. A liquid crystal display device according to claim 4, wherein liquid crystal molecules located on the structure or slit are aligned, accompanying a change in the azimuth upon application of voltage.

30 6. A liquid crystal display device comprising:
35 a liquid crystal cell comprising a pair of substrates and a liquid crystal layer arranged between the pair of substrates;

first and second polarizers arranged on either side of the liquid crystal cell;

a first retardation plate arranged between the liquid crystal cell and the first polarizer;

a second retardation plate arranged between the liquid crystal cell and the second polarizer;

5 each of the first and second retardation plates having an optical axis in a plane parallel to the surfaces of the substrates and a retardation of substantially $\lambda/4$, the optical axis of the first retardation plate being perpendicular to the optical axis 10 of the second retardation plate;

the first and second polarizers having polarizing axes arranged at an angle of 45° with respect to the optical axes of the first and second retardation plates;

15 the liquid crystal of the liquid crystal cell being of a vertical alignment type, the liquid crystal cell including structures or slits arranged on or in an electrode of at least one of the substrates, a state of alignment of the liquid crystal molecules 20 located on one side of the structure or the slit being different from a state of alignment of the liquid crystal molecules located on the other side of the structure or the slit; and

25 at least one of the pair of substrates having electrically conductive linear structures.

7. A liquid crystal display device comprising:

a liquid crystal cell comprising a pair of substrates and a liquid crystal layer arranged between the pair of substrates;

30 first and second polarizers arranged on either side of the liquid crystal cell;

a first retardation plate arranged between the liquid crystal cell and the first polarizer;

35 a second retardation plate arranged between the liquid crystal cell and the second polarizer; each of the first and second retardation plates having an optical axis in a plane parallel to the

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surfaces of the substrates and a retardation of substantially $\lambda/4$, the optical axis of the first retardation plate being perpendicular to the optical axis of the second retardation plate;

5 the first and second polarizers having polarizing axes arranged at an angle of 45° with respect to the optical axes of the first and second retardation plates;

10 the liquid crystal of the liquid crystal cell being of a vertical alignment type, the liquid crystal cell including structures or slits arranged on or in an electrode of at least one of the substrates, a state of alignment of the liquid crystal molecules located on one side of the structure or the slit being different from a state of alignment of the liquid crystal molecules located on the other side of the structure or 15 the slit; and

20 a retardation in the plane of the retardation plate being not less than 120 nm and not more than 160 nm.

25 8. A liquid crystal display device according to claim 7, wherein an angle between the absorbing axis of the polarizer and the aligning direction or the inclining direction of liquid crystal molecules is not less than 5°, and the contrast characteristic is symmetrical with respect to the horizontal direction.

30 9. A liquid crystal display device according to claim 7, wherein at least one optical layer having a negative retardation is arranged between the retardation plate and the liquid crystal cell or between the retardation plate and the polarizer.

35 10. A liquid crystal display device comprising: a liquid crystal cell comprising a pair of substrates and a liquid crystal layer arranged between the pair of substrates;

a film causing light to scatter in a specific direction; and

the liquid crystal of the liquid crystal cell being of a vertical alignment type, the liquid crystal cell including structures or slits arranged on or in an electrode of at least one of the substrates, a state of alignment of the liquid crystal molecules located on one side of the structure or the slit being different from a state of alignment of the liquid crystal molecules located on the other side of the structure or the slit.

11. A liquid crystal display device according to
claim 10, further comprising a uniaxial stretched film, a
biaxial stretched film and a film having a negative
retardation so that the viewing angle characteristic of
the liquid crystal display can be improved.

15 12. A liquid crystal display device comprising:
 a liquid crystal cell comprising a pair of
 substrates and a liquid crystal layer arranged between
 the pair of substrates;
20 first and second polarizers arranged on
 either side of the liquid crystal cell;
 a first retardation plate arranged between
 the liquid crystal cell and the first polarizer;
 a second retardation plate arranged
 between the liquid crystal cell and the second polarizer;
25 each of the first and second retardation
 plates having an optical axis in a plane parallel to the
 surfaces of the substrates and a retardation of
 substantially $\lambda/4$, the optical axis of the first
 retardation plate being perpendicular to the optical axis
 of the second retardation plate;
30 the first and second polarizers having
 polarizing axes arranged at an angle of 45° with respect
 to the optical axes of the first and second retardation
 plates; and
35 the liquid crystal layer of the liquid
 crystal cell containing the liquid crystal and a resin
 coexisting with the liquid crystal.

13. A liquid crystal display device comprising:
a liquid crystal cell comprising a pair of substrates and a liquid crystal layer arranged between the pair of substrates;

5 first and second polarizers arranged on either side of the liquid crystal cell;

a first retardation plate arranged between the liquid crystal cell and the first polarizer;

10 a second retardation plate arranged between the liquid crystal cell and the second polarizer;

each of the first and second retardation plates having an optical axis in a plane parallel to the surfaces of the substrates and a retardation of substantially $\lambda/4$, the optical axis of the first 15 retardation plate being perpendicular to the optical axis of the second retardation plate;

20 the first and second polarizers having polarizing axes arranged at an angle of 45° with respect to the optical axes of the first and second retardation plates;

the liquid crystal of the liquid crystal cell being of a vertical alignment type, a polymer network being formed in the liquid crystal layer of the liquid crystal cell, the pretilt of the liquid crystal molecules and an inclination direction of the liquid crystal molecules upon application of voltage being 25 regulated by the polymer network.